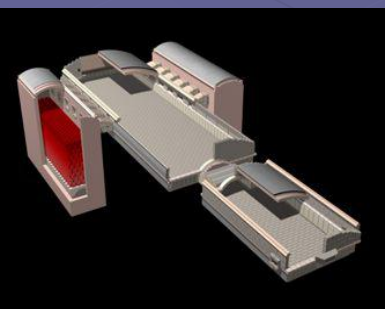
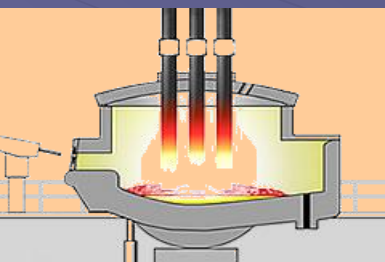


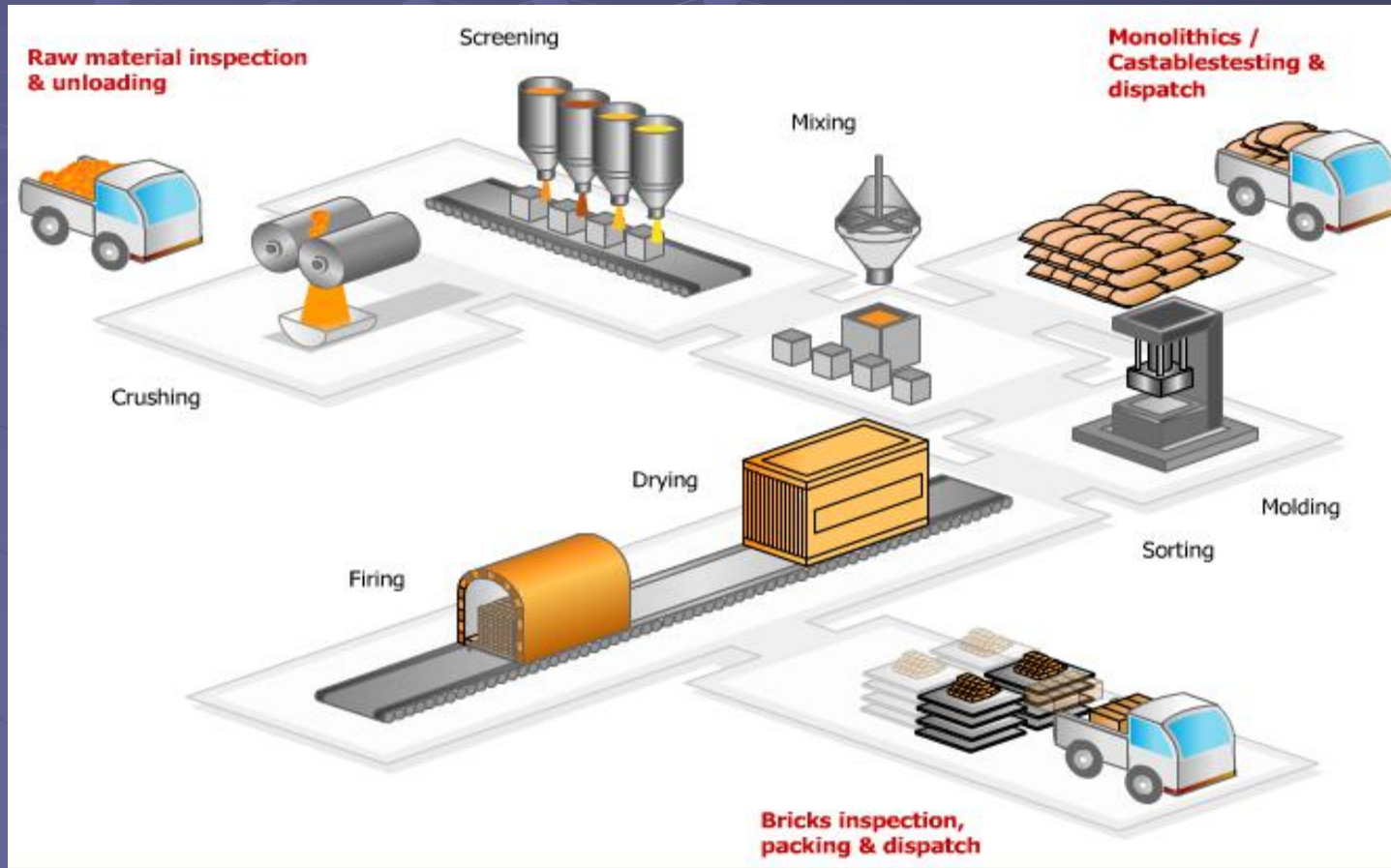
LMM refractory

LIAONING MINERAL & METALLURGY GROUP CO.,LTD

REFRACTORIES FOR ELECTRIC FURNACE



1. Process flow



2. Production facility and instrument

--- facility



LMM refractory



Fiction machine

Mixing machine

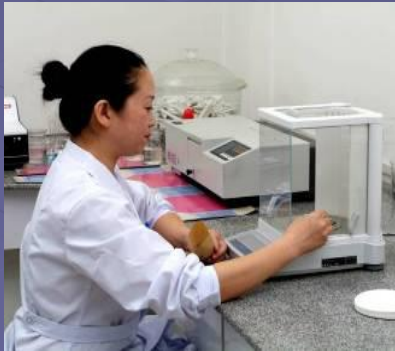
3. Production facility and instrument

--- instrument

Under the management of ISO9001 quality control system. From raw material to finished products, and carry out each physical test and chemical analysis with all types of testing apparatus, which include thermal shock resistance instrument, creep apparatus, reheating liner change apparatus, etc

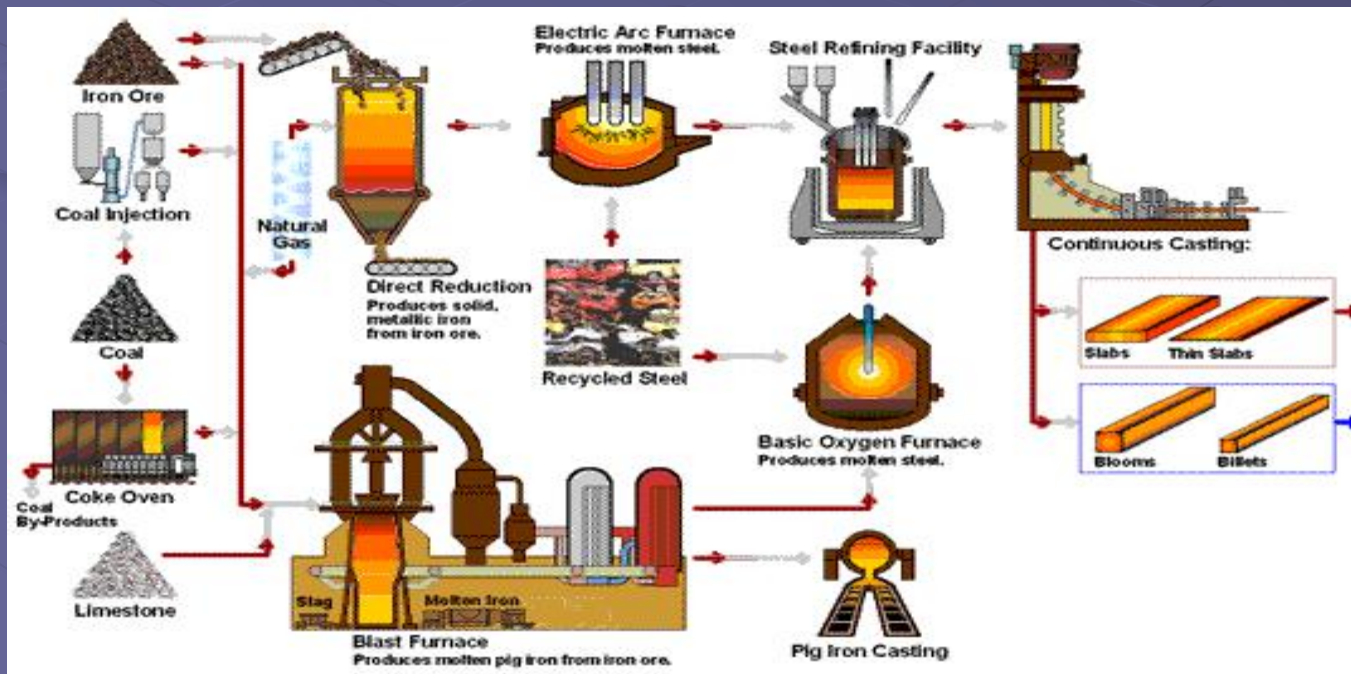


LMM refractory



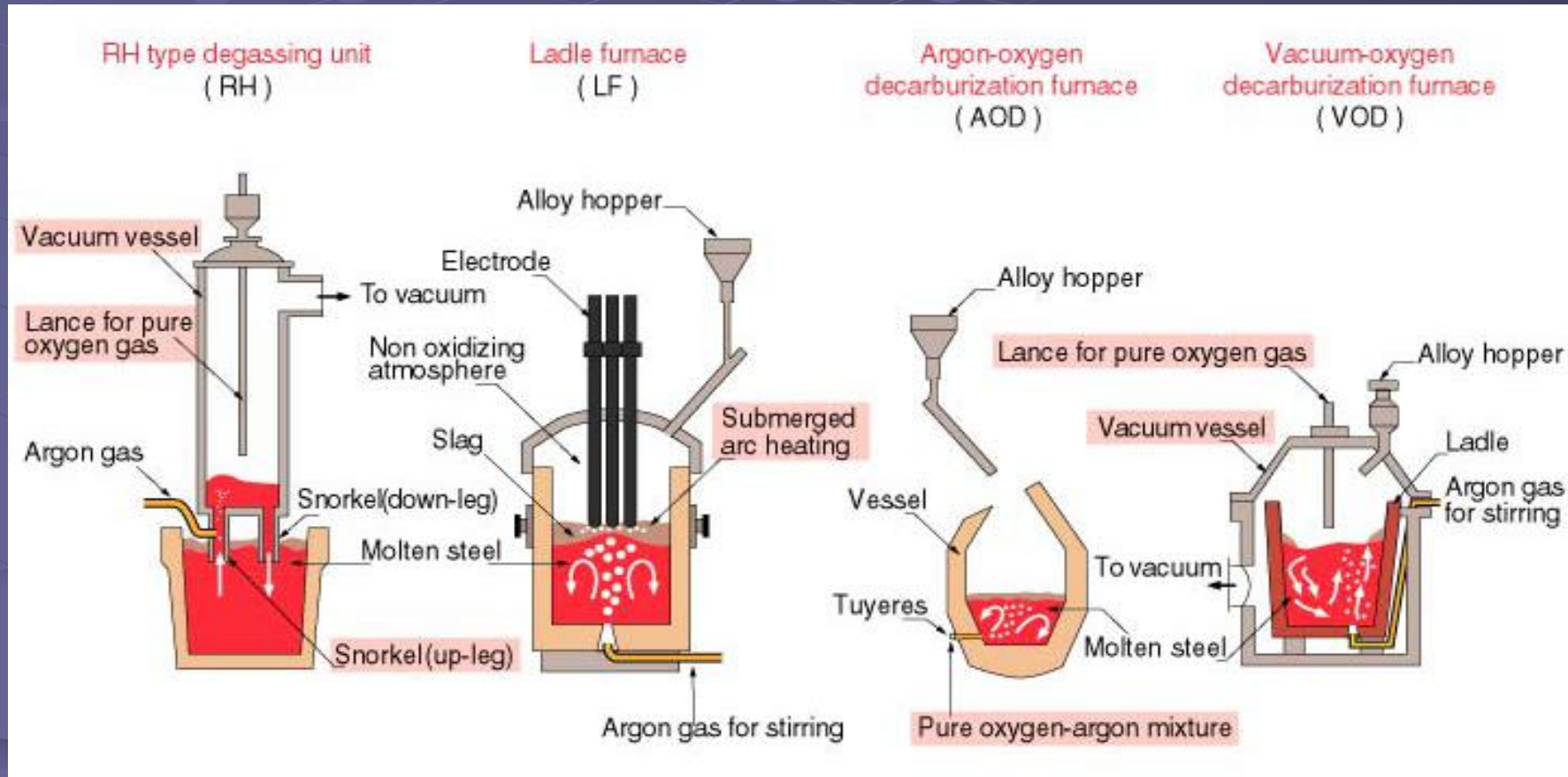
4. The application of refractory materials

- Torpedo Ladle
- Basic Oxygen Furnace (BOF)
- Electric Arc Furnace (EAF)
- AOD converter
- Ladle furnace
- Continuous Casting Material
- Glass Kiln furnace



5. The application of refractory materials

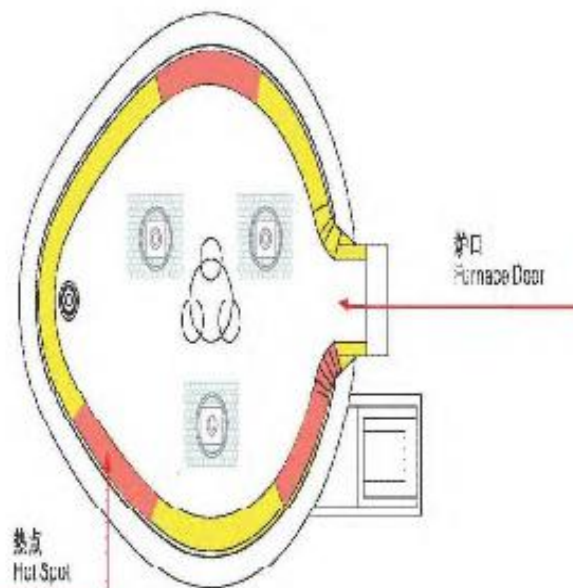
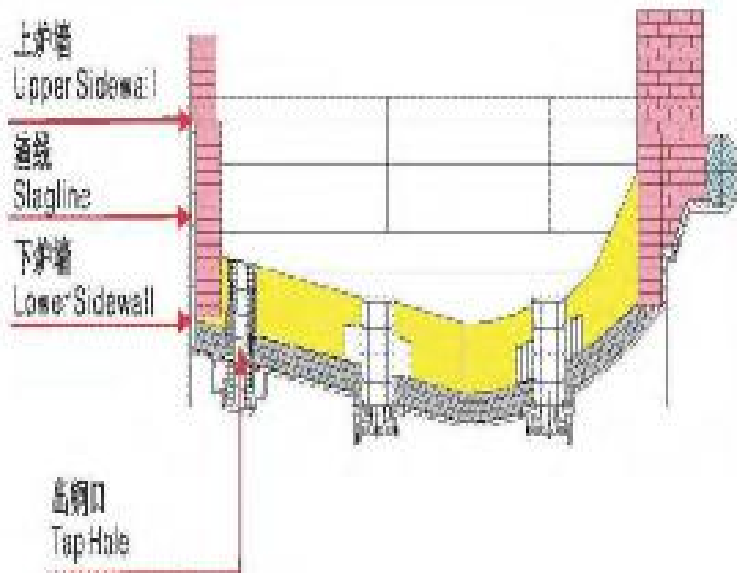
Typical Facilities for secondary refining



The refractory materials-EAF

EAF typical lining concept

Refractory Type	Application	Quality Recommendation
Safety Lining Bricks 	Safety Lining	Magnesia Bricks
Working Lining Bricks 	Slagline, Hot Spot	MgO-C Bricks
	Upper, Lower Sidewall	MgO-C Bricks
Monolithics	Bottom	Magnesia Ramming Mix
	Furnace Door	Fast Patching Mix
	Working Lining	Magnesia Gunning Mix
	Installation Monolithics	Magnesia Mortar



The refractory materials-EAF

---- physical & chemical properties

Magnesia bricks for safety lining



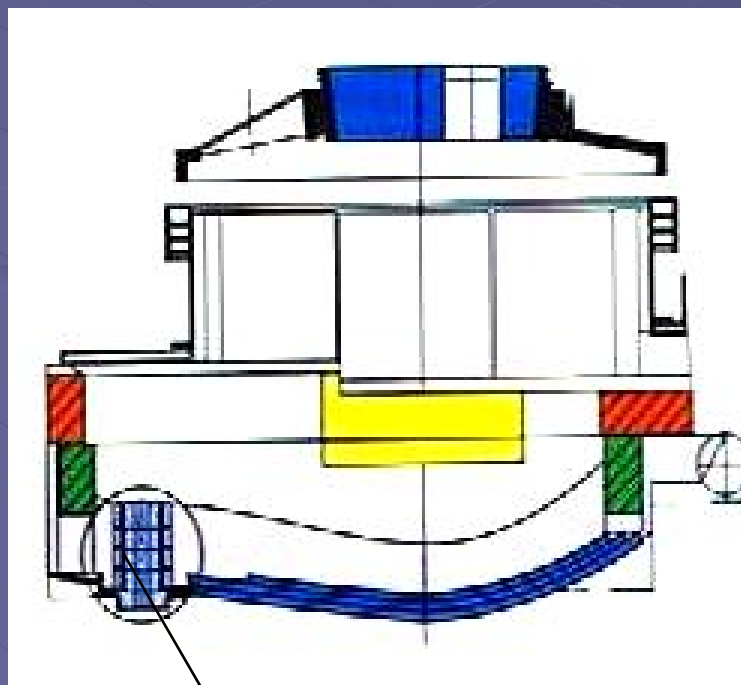
LMM refractory

Baked magnesia Specification	Typical Value			
MgO (%)	92	93	95	97
Fe ₂ O ₃ (%)	4	3.8	3.5	3.0
Density at cold(g/ cm ³)	3.01	3.02	3.03	3.04
Compressive strength at cold (N / mm ²)	97	99	103	106
Apparent porosity	14.8	14.7	14.6	14.5
Refractories under load T ₂ (° C)	1600	1620	1650	1700



The refractory materials-EAF

Magnesia carbon bricks: made of 96-99% electric fused magnesia and 194-199 large crystal natural flake graphite, with anti-oxidation additives and special resin bond. With superior resistance to slag, corrosion, oxidation, thermal shock and constructional spalling etc.



EAF Tap hole brick set

 Hot spots

MC 14A

MC 18A

 Slag line

MC 14

MC 18

 Upper side wall

MC 8

MC 10

 Tapping hole

MC 18

MC 18A



The refractory materials-EAF



LMM refractory

---- physical & chemical properties magnesia carbon bricks

Magnesia carbon bricks (Typical Value)					
Chemical Analysis of magnesia	MgO(%)	95	96	97	98
	Fe ₂ O ₃ (%)	0.87	0.84	0.8	0.75
	CaO/SiO ₂	2	2	2	2
C (%)		8.5	12.86	12.75	12.63
Apparent Porosity (%) ≤		5	4.6	4.5	4.4
Bulk Density (g/cm ³) ≥		3.0	3.0	3.03	3.05
Cold Crushing Strength (MPa) ≥		55	49	55	53



The refractory materials-EAF

---- Bricks For Electric Arc Furnace Roofs



Item	Burned bricks			Unburned Bricks		
	DL-80	DL-75	DL-65	BDL-80	BDL-75	BDL-65
AL ₂ O ₃ %	≥80	≥75	≥65	≥80	≥75	≥65
Refractoriness under Load	≥1530	≥1520	≥1520	≥1530	≥1520	T3≥1470
Permanent Linear Change % (1500°C×2h)	0.2~-0.4	0.2~-0.4	0.2~-0.4	/	/	/
Apparent Porosity	≤21	≤21	≤23	≤20	≤20	23
Cold crushing strength Mpa	≥75	≥65	≥58.8	≥60	≥55	≥30
Application	the roof of EAF					

The refractory materials-EAF



---- brick sizes

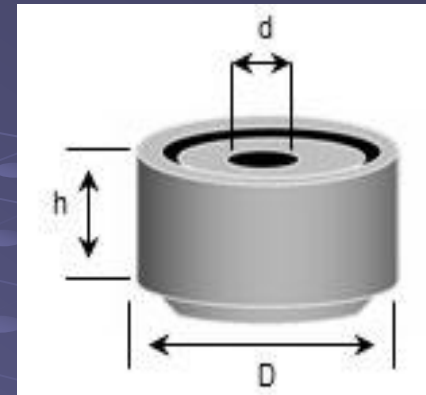
ARC furnace bricks	Item	Dimensions in (mm)				Volume (dm ³)
		a	b	h	l	
	30/40	170	130	300	100	4.5
	30/20	160	140		100	
	30/8	213	154		100	
	35/80	190	110	350	100	5.25
	35/40	170	130		100	
	35/20	160	140		100	
	35/8	154	146		100	
	35/0	150	150	100	100	6
	40/80	190	110	400	100	
	40/20	110	90		100	
	40/8	154	146		100	
	40/0	150	150	100	100	6.75
	45/90	195	105	450	100	
	45/20	160	140		100	
	45/8	154	146		100	
	45/0	150	150	100	100	7.5
	50/100	200	100	500	100	
	50/60	180	120		100	
	50/20	160	140		100	
	50/8	154	146		100	
50/0	150	150	100			
60/60	180	120	600	100	9	
60/40	170	130		100		
60/20	160	140		100		
60/0	150	150		100		

The refractory materials-EAF

---- EBT brick sizes

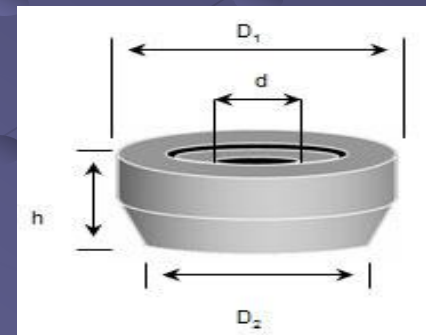
END BRICKS

D_1	D_2	d	h	(dm^3)
457	397	150	180	23,38
457	397	160	180	23,00
457	397	170	180	22,59
457	397	180	180	22,15
457	397	190	180	21,69
457	397	200	180	21,20



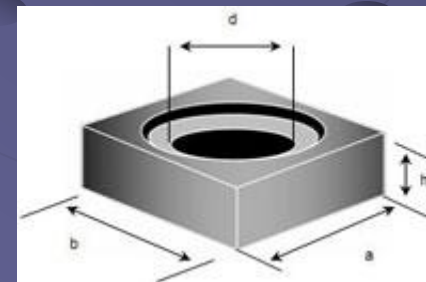
END BRICKS

D_1	D_2	d	h	(dm^3)
457	397	150	180	23,38
457	397	160	180	23,00
457	397	170	180	22,59
457	397	180	180	22,15
457	397	190	180	21,69
457	397	200	180	21,20



SURROUNDING BLOKS

D_1	D_2	d	h	(dm^3)
550	550	400	150	26,53
550	550	400	200	35,38



Reference list- customer



Name of customer	Furnace type	Products	Quantity(to n)	Time of supply
RCP, Philippines	60EAF& Ladle	MgO-C bricks, MgO-Cr bricks,high alumina bricks, fireclay bricks	300	July, 2008
ERDEMIR,Turkey	90 EAF	Magnesia bricks	250	October, 2009
Egecelik, Turkey	120 EAF	MgO-C bricks,high alumina bricks	155	March,2009
Kroman,Turkey	90 EAF&Ladle	MgO-C bricks, insulation bricks	60	September, 2008
Ishtiaq, Pakistan	40 EAF	MgO-C bricks, fireclay brick	40	March,2009
CACSO, Pakistan	30 EAF	MgO-C bricks, castable	150	January, 2008
Campic, Pakistan	30 EAF	MgO-C bricks, mortor	130	October, 2008
ASIA,Bangladesh	20 EAF	MgO-C bricks, castable	50	March,2009
Siderúrgica Barra Mansa, Brazil	60EAF& Ladle	MgO bricks	350	February, 2010
ACESITA,Brazil	90AOD	MgO-Cr bricks	100	March, 2008
LARCO, Greece	200ton EAF	MgO-Cr bricks,high alumina bricks	400	October,2007
LARCO, Greece	200ton EAF	MgO-Cr bricks,high alumina bricks	890	October,2008
LARCO, Greece	200ton EAF	MgO-Cr bricks,high alumina bricks	1000	October,2009
Evraz, South Africa	50 EAF	MgO-C bricks, high alumina bricks	120	January, 2010
Columbus Stainless, South Africa	50 EAF	Fireclay bricks,High alumina bricks	60	December,2009
Ternium, Mexico	Smelting furnace	MgO-Cr bricks	250	June,2010
AHMSA, Mexico	150 EAF	MgO-C bricks	100	June,2010
Enprotech, US	150 BOF	MgO-C bricks	500	February, 2010
Gecosteel, Syria	90EAF&Ladle	MgO-C bricks, MgO-Cr bricks,high alumina bricks, fireclay bricks	1105	May, 2008
Gecosteel, Syria	90EAF&Ladle	MgO-C bricks, MgO-Cr bricks,high alumina bricks, fireclay bricks	1210	August, 2010

Quality Certificate



LMM refractory



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